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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/001,986

10/31/2001

Henry Stephen Eilts

TI-32977

2814

23494

7590

02/22/2006

TEXAS INSTRUMENTS INCORPORATED

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DALLAS, TX 75265

EXAMINER

WANG, TED M

ART UNIT

PAPER NUMBER

2634

DATE MAILED: 02/22/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/001,986	EILTS ET AL.	
	Examiner	Art Unit	
	Ted M. Wang	2634	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1,2,5-13,15-23,25-31,33-35,37,38 and 40-43 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 23, 25, 26, 28-31, 33-35, 37, and 38 is/are allowed.
- 6) ☒ Claim(s) 1,2,4,10-13,21,22,40 and 42 is/are rejected.
- 7) ☒ Claim(s) 5-9,15-20,27,41 and 43 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 October 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)             | 4) <input type="checkbox"/> Interview Summary (PTO-413)                     |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____  |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____   | 6) <input type="checkbox"/> Other: _____                                    |

## **DETAILED ACTION**

### ***Response to Arguments***

1. The indicated allowability of claim 1, 2, 4, 10-13, 21, 22, 40, and 42 are withdrawn in view of the newly discovered reference(s) to US 6,563,885. Rejections based on the newly cited reference(s) follow.

### ***Claim Objections***

2. Claims 4 and 27 are objected to because of the following informalities:
- In claim 4, line 1, change "3" to --- 1 ---.
  - In claim 27, line 3, the expression is not of sufficient quality to permit examination.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claim 1, 2, 4, 10-12 are rejected under 35 U.S.C. 102(e) as being anticipated by Magee et al. (US 6,563,885).

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- With regard claim 1, Magee et al. discloses a front end portion (Fig.1 element 14) that receives and digitizes a data signal having one or more training tones and one or more data tones (column 3 lines 34-67 and column 5 lines 19-27); and a channel estimator component (Fig.1 element 22 and column 4 lines 1-27) that utilizes the digitized data signal to provide a partial channel estimate (column 3 lines 12-33) that is combined with at least one other partial channel estimate to provide an aggregated channel estimate (Fig.1 element 38, column 5 line 63 – column 6 line 58); and a burst counter that increments a count value on receipt of an incoming data signal (Fig.1 element 24 and column 6 lines 21-27), the count value determining which partial channel estimate is updated (Fig.1 element 24 and column 6 lines 21-27 and column 3 lines 12-33). Since the received signal can be partitioned into bursts, which contain a specified number of data tone (column 3 lines 16-18) and the decimation function 24 is programmed and/or configured to repeatedly count from zero to g-1, incrementing in response to receiving each burst and repeating the count after reaching g-1 (column 6 lines 21-24), it is inherent that the decimation function performs the same function as that of a burst counter.
- With regard claim 2, Magee et al. further discloses the channel estimator component being adapted to update the aggregated channel estimate every K data signals, where K is the number of partial channel estimates forming a full

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channel estimate (Fig.1 elements 22, 24, 30-38, column 6 lines 1-58, where  $g = K$ ).

- With regard claim 4, Magee et al. further discloses the count value being incremented modulo  $K$  (column 6 lines 13-42), where  $K$  is the number of partial channel estimates forming a full channel estimate.
- With regard claim 10, Magee et al. further discloses the data signal being transmitted in a multicarrier modulation format (column 4 lines 38-62).
- With regard claim 11, Magee et al. further discloses the system of claim 1 being implemented as part of a modem (Fig.6 element 326).
- With regard claim 12, Magee et al. further discloses the system of claim 1 being implemented as part of a wireless communication system coupled to the Internet (column 4 lines 47-62).

5. Claims 13, 21, 22, 40, and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by Magee (US 2003/0086508).

- With regard claim 13, Magee discloses a channel estimator (Fig.1 element 20 and Fig.2 element 202) comprising:

a Fast Fourier Transform portion (Fig.2 element 212) that receives a channel impulse response and performs a Fast Fourier Transform on the channel impulse response to provide a partial channel estimate (paragraphs 22, 23, and 30); and

a combiner that combines the partial channel estimate with at least one other partial channel estimate to provide an aggregated channel estimate

(paragraph 30), wherein the channel impulse response being determined using training tones embedded in a data burst (paragraphs 28 and 30) and a zero pad component that adds zeroes to the channel impulse response (Fig.2 element 210 and paragraph 30) till the channel impulse response has  $N/K$  number of time samples where  $N$  is the total number of tones in a data burst and  $K$  is the number of partial channel estimates that form a full channel estimate (paragraph 30).

Magee teaches that the channel estimate may be decimated such that a complete channel estimate is provided every  $N$  (or  $K$ ) bursts by combining a plurality of partial channel estimates such that only one partial estimate is updated in a single burst (paragraph 30). Magee further teaches that the channel estimator 202 extracts training tones and performs an IFFT to get the channel impulse response for a data burst and these operations are repeated for each data burst (or total number of tones in a data burst) received by the receiver (paragraph 23).

- With regard claim 21 and 22, Magee further discloses forming part of an application specific integrated circuit (paragraph 70) and being implemented as executable instructions programmed in a digital signal processor (paragraph 70). It is inherent that the DSP executes instructions being programmed inside the core of the processor.
- With regard claim 40, Magee further discloses a method for performing a channel estimation procedure comprising:

dividing a total number of tones  $N$  in each one of a plurality of data bursts into  $K$  sets (paragraphs 23 and 28);

determining a channel impulse response of  $1/K$ th of the channel for each data burst (paragraph 30); and

providing a full channel estimate every  $K$  bursts (paragraph 30).

Magee teaches that the channel estimate may be decimated such that a complete channel estimate is provided every  $N$  (or  $K$ ) bursts by combining a plurality of partial channel estimates such that only one partial estimate is updated in a single burst ( $1/K$ th) (paragraph 30). Magee further teaches that the channel estimator 202 extracts training tones and performs an IFFT to get the channel impulse response for a data burst and these operations are repeated for each data burst (or total number of tones in a data burst) received by the receiver (paragraph 23).

- With regard claim 42, Magee further discloses a communication device comprising:

means for dividing a total number of tones  $N$  in each one of a plurality of data bursts into  $K$  sets (paragraphs 23 and 28);

means for determining a channel impulse response of  $1/K$ th of the channel for each data burst (paragraph 30); and

means for providing a full channel estimate every  $K$  bursts (paragraph 30).

Magee teaches that the channel estimate may be decimated such that a complete channel estimate is provided every  $N$  (or  $K$ ) bursts by combining a

plurality of partial channel estimates such that only one partial estimate is updated in a single burst ( $1/K_{th}$ ) (paragraph 30). Magee further teaches that the channel estimator 202 extracts training tones and performs an IFFT to get the channel impulse response for a data burst and these operations are repeated for each data burst (or total number of tones in a data burst) received by the receiver (paragraph 23).

### ***Allowable Subject Matter***

6. Claims 23, 25, 26, 28-31, 33-35, 37, and 38 allowed.
7. Claims 5-9, 15-20, 41, and 43 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

### ***Conclusion***

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ted M. Wang whose telephone number is 571-272-3053. The examiner can normally be reached on M-F, 7:30 AM to 5:00 PM.

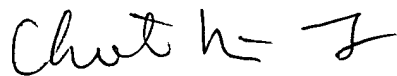
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chieh Fan can be reached on 571-272-3042. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.



Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ted M Wang  
Examiner  
Art Unit 2634

Ted M. Wang



CHIEH M. FAN  
SUPERVISORY PATENT EXAMINER